

STABILIZE PAYLOADS IN MOTION
High-Precision Motion Control Systems
for the Most Challenging Environments

**CURTISS-
WRIGHT**

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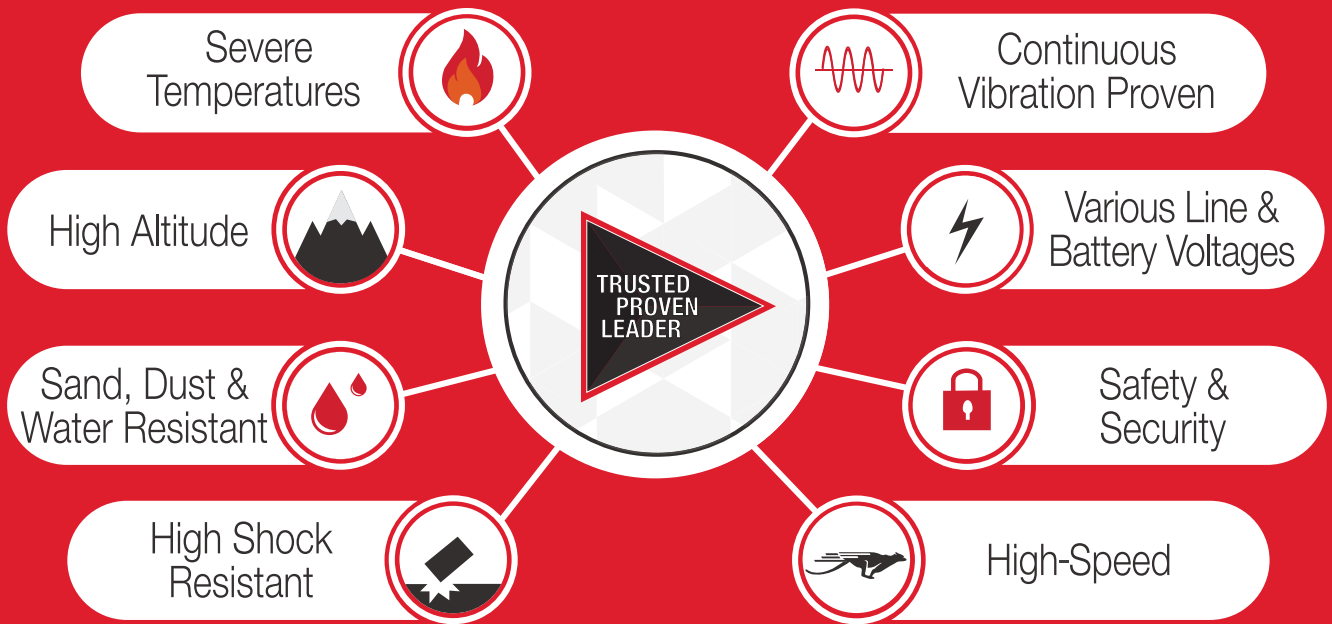
**TRUSTED
PROVEN
LEADER**

PURPOSE-BUILT, FULLY TAILORED MOTION CONTROL SYSTEMS

Stabilize payloads in motion, on the ground and in the air with rugged, high-precision, and fully configurable motion control systems from Curtiss-Wright Drive Technology. Our scalable motion control systems are developed and manufactured for complex and demanding applications, such as

- High-speed public transportation
- Amusement park rides
- Camera crane rigs
- Military applications
- Specialty lift applications

The challenges we can address are almost endless. Every system we deliver is adapted and configured for the application's unique program, technical, and environmental requirements and is engineered to provide unmatched levels of reliability and precision in the most challenging environments. All of our systems are backed by more than 70 years of research and innovation in electromechanical and electrohydraulic drive systems.





Accelerate Development with Proven Building Blocks

Our modular motion control systems are built on a portfolio of field-proven components:

- Rotary gear drives
- Linear gear drives
- Motor controllers
- Hand controllers
- Gyroscopes
- Software



These modules can be used in systems that rely on commonly used voltages or use batteries. Our evolutionary approach to system development allows us to quickly adapt and configure existing components to meet even the most unique and challenging motion control requirements. It also ensures that each system we deliver incorporates the latest advances in motion control and inertial stabilization technology.

Most importantly, our building-block approach and advanced system development processes allow us to cost-effectively jump start delivery of fully integrated motion control systems to accelerate time to market and reduce risks for any requirements. We provide the motion control hardware, software, and services needed to address the toughest stabilization challenges and always deliver highly reliable motion control systems on spec, on time, and on budget.

Stabilize Payload Movements in the Harshest Environments

Our motion control systems are engineered to precisely stabilize and control high-speed movements. They ensure the safety of people and equipment in the harshest environments. Every component undergoes extensive testing to ensure it performs reliably and accurately in the most rugged geographic locations and the most severe weather conditions:

- Sandy, dusty, and wet environments
- Extreme heat and cold
- Bumpy, potholed, and rutted terrain
- High-altitude locations

Increase Safety and Comfort on High-Speed Public Transportation

High-speed public transportation systems require motion control that enables exceptionally precise and responsive movements in a range of operational areas.

Our motion control systems provide the stability needed for a variety of high-speed applications:

- Tilting systems that maintain car stability and optimize passenger comfort when high-speed trains travel around curves
- Active actuation systems for bogies and wagons
- Lane stabilization for trains

Train Tilting Systems

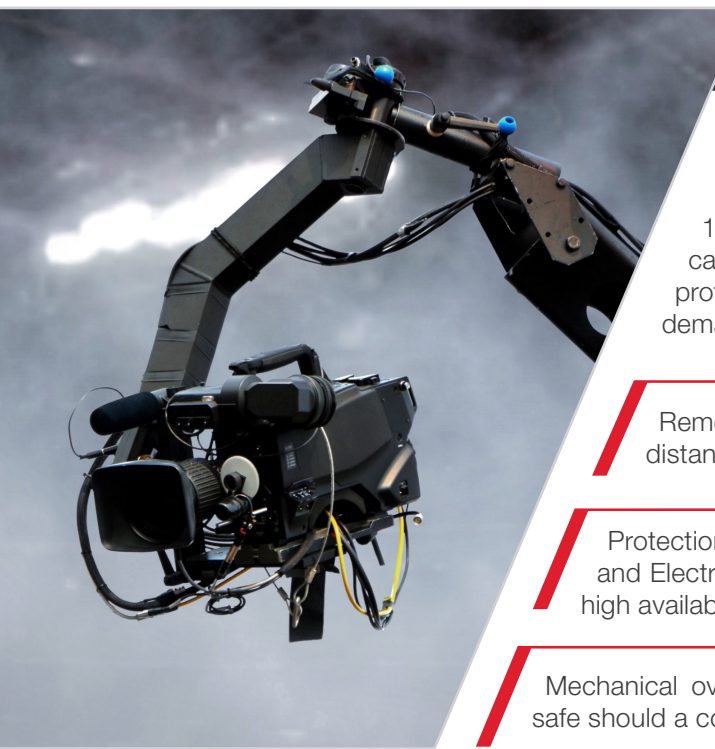
Our train tilting systems use a combination of sensors and train-tilting computers to almost imperceptibly tilt each car at an angle of $\pm 8^\circ$ as high-speed trains round curves in the track. The system's highly engineered precision tilting technology enables exceptionally responsive tilting that produces smooth car body movements to maintain stability in passenger compartments at all times.

With a train tilting system from Curtiss-Wright Drive Technology, rail operators can avoid slowing down high-speed trains as they round curves to enable safer, more comfortable passenger travel and maintain schedules.



Capture Action in Motion

The camera cranes used to film high-speed action sequences must remain steady to enable extremely smooth shots, even as platforms race around tight corners, bounce over tough terrain, and zigzag through crowded streets. With our cutting-edge, gyro-stabilized camera crane stabilization system, cinematographers and directors can capture scenes that were previously not possible. They have an exceptionally rugged and steady shooting platform that lets them safely put their cameras into the center of the action in any location and any weather conditions.



Camera Crane Stabilization Systems

Our stabilized camera platform allows steady shots at vehicle speeds up to 120 km/h and a crane velocity range of 0.01 to 120°/sec., enabling filmmakers to capture the most amazing car chases and action scenes. These systems are designed to protect and control camera equipment during the most intense and demanding action shoots:

Remote control of camera crane operation keeps people at a safe distance from the action

Protection against over temperature, over current, short circuiting, and Electromagnetic Interference (EMI) ensures reliable operation and high availability of electronics in the most challenging conditions

Mechanical overload protection mechanisms keep the drive system safe should a collision occur

Bring High-Precision Load Balancing to Speciality Lift Applications

Our motion control systems are engineered to ensure highly accurate and secure payload movements on almost any moving platform. As a result, they can be adapted and configured for almost any speciality lift application that requires extremely precise external load balancing.

The high-precision cranes that are used on ships and offshore oil platforms to efficiently and accurately move cargo provide a good example of speciality lift requirements. These cranes operate on platforms at sea, making it very challenging to keep loads balanced and stable as they are being picked up, carried, and relocated. Our systems can be designed to ensure crane heads remain level and steady, even in rough sea conditions, to ensure the safety of personnel, equipment, and cargo at all times.

Our motion control systems can also be tailored for speciality lift applications such as:

- Equipment and supply deliveries to remote locations
- Antenna installations
- Forestry and logging applications
- Aerial firefighting
- Search and rescue missions
- High-altitude and remote construction projects



Stable High-Speed Amusement Park Rides

High-speed amusement park rides are designed to entertain and thrill people. The challenge is to deliver speed and excitement that people will pay to experience in the safest, most enjoyable way possible.

Our advanced motion control systems are the perfect fit for amusement park ride requirements because they are designed from the ground up to ensure guests enjoy a safe and steady ride as they zoom up and down the steepest tracks, around the tightest curves, and through the wildest loops. And they are ruggedized to provide highly reliable and safe ride operation for many years, even in harsh weather conditions.

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With our combination of modular building blocks, extensive experience with tilting technology, and proven drive systems, we have everything needed to design an optimized stable system, built for a truly exciting ride.



Maintain Accurate Control of Motion Systems on Military Vehicles

To increase the safety of personnel and equipment in the field, modern armored land vehicles must be able to accurately locate a target and stabilize a shot while in motion.

Our motion control systems for rugged defense platforms are engineered to provide reliable, cost-effective aiming and stabilization, and are tailored to meet the unique program and platform requirements of the defense industry.

Aiming and Stabilization Systems

Our modular Turret Drive Servo System (TDSS) provides a high degree of motion control and stability for battle tanks, infantry fighting vehicles, and remote weapons stations. The TDSS is available in three standard configurations:

Manual Configuration

Engineered for mechanical movement with a manual drive

Electromechanical Configuration

Engineered for electrical movement with a servo drive

Gyro-Stabilized Configuration

Engineered for electrical movements and basic to high-performance stabilization

These standard configurations can be adapted to meet the needs of any platform and provide an easy upgrade path from a lower-cost solution to a fully stabilized system.



Partner with an End-To-End Provider

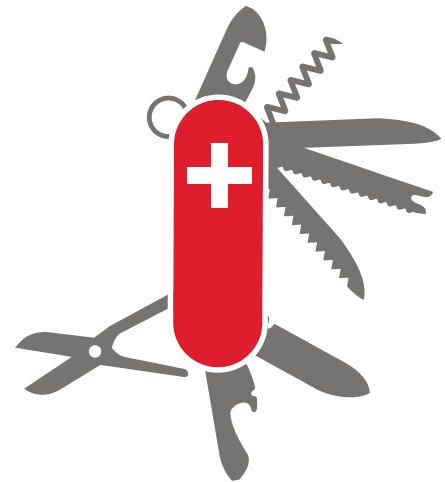
At Curtiss-Wright Drive Technology, we take a complete life cycle approach to drive system development and support, from project conception to reliable field operation for up to 30 years. We are your single source for:

- Expert engineering services for simulation and prototype development as well as fully integrated software, hardware, and systems
- Program management services that keep you informed every step of the way and guarantee optimal cost efficiency
- Extensive testing services at the qualification, stress, production, and series testing stages
- Complete commissioning services
- Obsolescence management services
- Maintenance, repair, and operations (MRO) services

Rely on Swiss Quality and Precision

As a Swiss company, our strong focus on quality, reliability, and environmental protection allows us to tackle tougher terrain, reach higher speeds, and seize new opportunities. We are certified to ISO 9001:2015, and we achieve the highest possible quality standards through use of:

- Sophisticated test equipment
- Compliance to the Restriction of the use of certain Hazardous Substances directive (RoHS) and the regulation on Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH)
- Model-based software development in accordance with EN 61508



Leverage a Legacy of Trust and Innovation

Curtiss-Wright Drive Technology has been a part of Curtiss-Wright Defense Solutions since 1999. As the trusted, proven leader in comprehensive, rugged, mission-critical solutions for the defense and aerospace industries for more than 80 years, Curtiss-Wright Defense Solutions understands how to deliver exceptionally reliable solutions that reduce program risk.

From innovative COTS modules to highly engineered subsystems and fully integrated systems, Curtiss-Wright Defense Solutions provides technology insights, engineering innovation, application experience, and regulatory knowledge that is trusted by defense departments, commercial avionics companies, and systems integrators worldwide.



A Pioneering Spirit

The spirit of innovation at Curtiss-Wright Corporation (NYSE:CW) reaches back to the first flight of the Wright Flyer by Wilbur and Orville Wright at Kitty Hawk, NC, and the American aviation and motorcycling pioneer, Glenn Curtiss.

Today, as a global corporation with thousands of employees worldwide, we continue to apply the spirit of our founders to everything we do, pressing forward in the quest to achieve feats of scientific achievement and technological advancement once thought impossible.

At the Curtiss-Wright Drive Technology facility in Switzerland, we employ more than 100 people who are dedicated to upholding the legacy and core values of Curtiss-Wright in every aspect of our operations.





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